

FORM PTO-1390 (REV. 11-2000)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER UPA-01149
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371			U.S. APPLICATION NO. (If known, see 37 CFR 1.5) 09/831581
INTERNATIONAL APPLICATION NO. PCT/CN98/00276	INTERNATIONAL FILING DATE November 20, 1998	PRIORITY DATE CLAIMED	
TITLE OF INVENTION Input Method Of Matrix Type For Entering Alphabets Or Phonetic Symbols Of Multiple Languages			
APPLICANT(S) FOR DO/EO/US Chienhsin Kuo and Minghui Li			
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:			
<p>1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.</p> <p>2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.</p> <p>3. <input type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.</p> <p>4. <input checked="" type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (Article 31).</p> <p>5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2))</p> <p>a. <input checked="" type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau).</p> <p>b. <input type="checkbox"/> has been communicated by the International Bureau.</p> <p>c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US).</p> <p>6. <input checked="" type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).</p> <p>a. <input checked="" type="checkbox"/> is attached hereto.</p> <p>b. <input type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4).</p> <p>7. <input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))</p> <p>a. <input type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau).</p> <p>b. <input type="checkbox"/> have been communicated by the International Bureau.</p> <p>c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired.</p> <p>d. <input type="checkbox"/> have not been made and will not be made.</p> <p>8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).</p> <p>9. <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).</p> <p>10. <input type="checkbox"/> An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).</p> <p>Items 11 to 20 below concern document(s) or information included:</p> <p>11. <input type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98.</p> <p>12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.</p> <p>13. <input type="checkbox"/> A FIRST preliminary amendment.</p> <p>14. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment.</p> <p>15. <input type="checkbox"/> A substitute specification.</p> <p>16. <input type="checkbox"/> A change of power of attorney and/or address letter.</p> <p>17. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825</p> <p>18. <input type="checkbox"/> A second copy of the published international application under 35 U.S.C. 154(d)(4).</p> <p>19. <input type="checkbox"/> A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).</p> <p>20. <input type="checkbox"/> Other items or information:</p>			
<p>I hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231, on the date below.</p> <p>Date: <u>May 12, 2001</u></p> <p>Mail Label #: <u>EF 400796421 US</u></p> <p>By: <u>[Signature]</u></p>			

U.S. APPLICATION NO. 09/831581 INTERNATIONAL APPLICATION NO. PCT/CN98/00276		ATTORNEY'S DOCKET NUMBER UPA-01149	
21. <input checked="" type="checkbox"/> The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)): Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO. \$1000.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$860.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$710.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$690.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00 ENTER APPROPRIATE BASIC FEE AMOUNT =		CALCULATIONS PTO USE ONLY <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> \$ 1000 </div>	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).		<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> \$ 0 </div>	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE
Total claims	6 - 20 =		x \$18.00
Independent claims	1 - 3 =		x \$80.00
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$270.00
TOTAL OF ABOVE CALCULATIONS =		<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> \$ 1000 </div>	
<input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.		<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> \$ -500 </div>	
SUBTOTAL =		<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> \$ 500 </div>	
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).		<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> \$ 0 </div>	
TOTAL NATIONAL FEE =		<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> \$ 500 </div>	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +		<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> \$ 0 </div>	
TOTAL FEES ENCLOSED =		<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> \$ 500 </div>	
		Amount to be refunded: \$	
		charged: \$	
a. <input checked="" type="checkbox"/> A check in the amount of \$ <u>500</u> to cover the above fees is enclosed. b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed. c. <input type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. _____. A duplicate copy of this sheet is enclosed. d. <input type="checkbox"/> Fees are to be charged to a credit card. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.			
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.			
SEND ALL CORRESPONDENCE TO: Thereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231, on the date below. Date: <u>May 12, 2001</u> Mail Label #: <u>EF 400796421 US</u>		SIGNATURE <u>5-12-2001</u> Jason Z. Lin NAME <u>①</u> 37,492 REGISTRATION NUMBER	

10/PRTS

09/831581
JC08 Rec'd PCT/PTO 12 MAY 2001

**INPUT METHOD OF MATRIX TYPE FOR ENTERING ALPHABETS OR
PHONETIC SYMBOLS OF MULTIPLE LANGUAGES**

FIELD OF THE INVENTION

[0001] The present invention generally relates to a method of entering alphabets or
5 phonetic symbols of multiple languages, and more specifically to an input method of
using minimum number of keys based on the concept of a two-dimensional matrix and
entering a alphabets or character symbol by pressing two numerical keys on a keyboard.

BACKGROUND OF THE INVENTION

[0002] Most of modern information appliances have a display and a keypad for
10 showing and entering user inputs. In English, there are twenty-six alphabets. German has
additional four alphabets "ä", "ö", "ü", and "ß". To enter inputs in both English and
German languages, thirty alphabets are required. If more languages such as French,
Italian and Spanish are to be entered, more alphabets have to be included. For an
information appliance to be portable and popular, it has to be designed as light, thin, short
15 or small as possible. Therefore, using one key for each alphabet or phonetic symbol on
the keypad of an information appliance has become impractical.

[0003] FIG. 1 shows a comparison of alphabets used in English, German, French,
Italian and Spanish languages. A standard keyboard used in the European countries for
these languages requires more than twenty keys. In addition to difficulty in finding the
20 correct key because of the large number of keys, the number of keys required are too
many to fit into a small palm-top personal assistance device or a cellular phone. As a
result, most of the cellular phones in the market rely on pressing numerical keys multiple

times to enter an alphabet. This input method is very clumsy and inconvenient.

[0004] FIG. 2 illustrates the keypad of a Star TEC cellular phone manufactured by Motorola. As an example, to enter the word "FILL", a user has to press the key "3" three times to represent "F", the key "4" three times to represent "I", the key "5" three times to represent "L", the key "#" before entering the next "L", and finally the key "5" three times to represent "L". In other words, it takes thirteen key entries to enter the word "FILL". If the alphabet "ç" is to be entered, the key "2" needs to be pressed nine times continuously. Similarly, on a cellular phone GF768 manufactured by Ericsson, the key "2" has to be pressed eight times continuously to show the French alphabet "ç".

[0005] As described above, the complexity of these input methods makes it necessary to carry and refer to a manual in order to enter alphabets for different languages. On one hand, the conventional method of entering alphabets and the number of times to press keys have been a great inconvenience in using an information appliance. On the other hand, if the number of keys has to be increased, the keypad becomes an obstacle for providing a small, short, thin and light information appliance.

SUMMARY OF THE INVENTION

[0006] This invention has been made to overcome the above mentioned drawback of the conventional input methods for entering alphabets or phonetic symbols for various languages on a key pad. The primary object is to provide a new method for selecting a different language from multiple languages and entering its corresponding alphabets or phonetic symbols efficiently.

[0007] Accordingly, the present invention provides a keypad input method based on

the concept of a two dimensional matrix. The alphabets or phonetic symbols of a language are divided into several groups. Each group is assigned to and labeled on a numerical key. To enter an alphabet or phonetic symbol in a group, the corresponding numerical key is first pressed. A second numerical key is then pressed according to the position of the alphabet or phonetic symbol labeled in the selected group.

[0008] The selection of a language from multiple languages follows a similar principle. By assigning a key such as the numerical key "0" for language selection, symbols representing different languages are grouped and labeled in the key. A language can be selected by pressing the numerical key "0" followed by pressing a numerical key whose digit corresponds to the position of the symbol of the language. In some languages, there are symbols for modifying an alphabet or indicating different tones of a phoneme, the symbols can also be grouped and assigned to the numerical keys in a similar way.

[0009] Based on the principle of a two dimensional matrix, the number of keys required to enter a language having a total number of X alphabets or phonetic symbols is $Y = \sqrt{X}$. If the square root of the total number of alphabets or phonetic symbols is not an integer number, the integer part of the square root plus one is the required number of keys.

[0010] The foregoing and other objects, features, aspects and advantages of the present invention will become better understood from a careful reading of a detailed description provided herein below with appropriate reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1 shows a comparison between the alphabets of German, French, Italian, Spanish and English.

[0012] FIG. 2 shows the keypad of a Star TEC cellular phone manufactured by Motorola.

[0013] FIG. 3 illustrates how alphabets or phonetic symbols of multiple languages are grouped and assigned to the numerical keys according to the invention.

[0014] FIG. 4 shows the representation of Japanese phonetic symbols using English alphabets.

10 **[0015]** FIG. 5 shows the representation of Korean phonetic symbols using English alphabets.

[0016] FIG. 6 shows the representation of Chinese consonants and vowels using English alphabets.

[0017] FIG. 7 illustrates how Japanese alphabets and phonetic symbols are grouped and assigned to the numerical keys according to the invention.

[0018] FIG. 8 illustrates how Korean alphabets and phonetic symbols are grouped and assigned to the numerical keys according to the invention.

[0019] FIG. 9 illustrates how Russian alphabets and phonetic symbols are grouped and assigned to the numerical keys according to the invention.

20 **[0020]** FIG. 10 illustrates how Arabian phonetic symbols are grouped and assigned to the numerical keys according to the invention.

[0022] According to an embodiment of the present invention, the alphabets of a country are grouped and assigned to the numerical keys. As shown in FIG. 3, the five vowels “a”, “e”, “i”, “o”, and “u” are assigned to the first alphabets of the numerical keys “1”, “2”, “3”, “4”, and “5” respectively. The remaining alphabets are sequentially grouped and assigned to these five numerical keys as can be seen in FIG. 3.

[0023] For the numerical key “1”, in addition to the alphabets “a”, “b”, “c”, and “d”, two commonly used symbols “,” and “.” are also assigned to the group. Similarly, the numerical key “2” was assigned with “e”, “f”, “g”, “h” and two other commonly used symbols “;” and “-”. Based on this principle, all twenty-six alphabets in English can be grouped and assigned to the five numerical keys “1”, “2”, “3”, “4”, and “5”. As shown in FIG. 3, the group of numerical key “5” contains “u”, “v”, “w”, “x”, “y” and “z”.

[0024] The numerical keys “6” and “7” are assigned with those symbols “””, “’”, “`”, “^”, “~”, “œ”, “ç”, “ß”, and “ñ” commonly used in French, German, Italian and Spanish. For example, a few symbols are used for “à”, “â”, “ä”, “è”, “ê”, “ë”, “ç”, “î”, “ï”, “ô”, “ö”, “ù”, “û”, and “ü” in French. A few symbols are used in German for “ä”, “ö”, “ü”, and “ß”, and in Italian for “à”, “è”, “ì”, “ò”, “ù”, “á”, “é”, “í”, “ó”, and “ú” as well as in

Spanish for “á”, “é”, “í”, “ó”, and “ú”.

[0025] According to the concept of a two dimensional matrix, each alphabet can be represented by a code consists of two digits. For example, the code of “a” is “11” because “a” is in the first position of the group assigned to the numerical key “1”. By pressing the numerical key “1” twice, the alphabet “a” is displayed. Similarly, the code of “w” is “53” because “w” is in the third position of the group assigned to the numerical key “5”. By pressing the numerical key “5” first and then the numerical key “3”, the alphabet “w” is displayed.

[0026] For alphabets that contain special symbols “’”, “`”, “^”, “~”, and “~”, their codes have to include more digits. For example, the alphabet “ü” used in both French and German is represented by the code “6151” in that “” is represented by the code “61” and “u” is represented by the code “51”. Following the same principle, the codes of all the special alphabets described above can be derived. For the special alphabets “œ” and “ç” in French, “ß” in German and “ñ” in Spanish, their codes are “66”, “71”, “72”, and “73” respectively.

[0027] The symbols “;”, “:”, “,” and “-” included in the groups of the numerical keys “1” and “2” have codes “15”, “16”, “25” and “26”. In addition, six symbols “?”, “!”, “.”, “(”, “)” and “/” are assigned to the numerical key “8”. Their respective codes are “81”, “82”, “83”, “84”, “85” and “86”. Because the symbol “(” has a few commonly used variations, “(”, “<”, “«”, and “[“ are all displayed when the code “84” is entered. User can then select one of them by pressing another numerical key. For example, “[“ is selected if the numerical key “4” is pressed after numerical keys “8” and “4” have been pressed. More symbols can be added based on the same principle.

[0028] With regard to entering the number “1”, “2”, “3”, “4”, “5”, “6”, “7”, “8”, “9” and “0”, they are assumed to be in the zero positions of the groups of their corresponding numerical keys. For example, the digit “3” is entered by pressing the numerical key “3” and then the numerical key “0” because its code is “30” based on the principle described
5 above.

[0029] According to the preferred embodiment of this invention, if the word “fill” is to be entered, the code “22313434” has to be pressed. Therefore, eight numerical keys have to be pressed in order to display “fill”. With the keying method used in a Star TEC cellular phone of Motorola, thirteen keys have to be pressed in order to display the same
10 word “fill”. It can be understood that the method of this invention is more efficient. Moreover, there is no need to remember how the alphabets are coded and their positions on the numerical keys.

[0030] The embodiment of this invention as described above can be used to enter the words of the languages whose alphabets are based on English. For other languages such
15 as Chinese, Japanese, Korean, Russian and Arabian, their words are not be spelled or represented by alphabets. Nevertheless, the words of these language can be pronounced by the phonetic symbols of English. By using the twenty-six English alphabets to form the phonics, these languages can also be represented as illustrated in FIGs. 4-6 for Japanese, Korean and Chinese.

[0031] As shown in FIG. 3, the present invention uses the numerical key “0” to select
20 different languages. The selection order of languages can be set according to the locality. If Chinese is the major language of the local area, the code “01” can be used to select Chinese. Order of other languages can then be set according to their frequencies of use in

the local area.

- [0032] FIG. 5 shows the phonetic symbols used in Korean. As illustrated in FIG. 8, Korean can be selected by entering the numerical keys “0” and “7” because the Korean language symbol is in the seventh position of the group assigned to the numerical key “0”. FIG. 8 shows how the Korean alphabets or phonetic symbols are grouped and assigned to the numerical keys. To show the Korean character “ㅁ” which can be represented by the pronunciation of “m”, the code “35” has to be entered by entering the numerical keys “3” followed by “5”. As can be seen, each Korean alphabet or phonetic symbol is grouped and assigned according to its representation of English alphabet.
- 10 [0033] Chinese language is more complicated to enter because there are five different tones in pronouncing phonics. Each tone represents a different character having a different meaning. In addition, there are many different characters that have identical pronunciation but different meanings. Several spelling methods for representing and entering Chinese characters using phonetic symbols can be found in the art.
- 15 [0034] FIG. 6 illustrates Chinese phonetics using English alphabets according to this invention. Each single consonant is represented by an English alphabet. Each single vowel is also represented by an English alphabet. Double vowels “an”, “en”, “ao”, “ai”, “ei”, “ou”, and triple vowels “ang”, “eng”, “ing”, “ong”, and constants “zh”, “sh”, “ch” are also each represented by a single English alphabet. The representation is also shown
- 20 in FIG. 3. To select five different tones, the numerical key “9” is used. The symbols “x”, “/”, “√”, “\”, and “-” for five different tones are grouped and assigned to the numerical key “9” with an order from 1 to 5.

[0035] As an example, when the word “zuo \” is entered by its code “56415194”, the display shows many characters that have this same pronunciation, i.e., “坐”, “座”, “做”, “祚”, “作”, “恡”, “柞”, and “酢” for further selection. If the character “做” is the one to be selected, the numerical key “3” should then be entered because the character “做” is in the third position on the displayed characters. In some cases, there are too many characters with the same pronunciation to be displayed on a same page. The symbol “→” which is reached by entering “96” as in FIG. 3 can be used to display more characters in another page. The symbol “→” can be used repeatedly to get a next page until the desired character is selected.

10 [0036] With reference to FIG. 7, Japanese alphabets or characters can be directly entered using English alphabets based on the principle of this invention. As shown in FIG. 7, Japanese phonetic symbols are grouped and assigned to the numerical keys. Japanese language includes three types of characters, i.e., hiragana, katakana and kanji. As mentioned earlier, the numerical key “0” can be used to select different languages. In order to select these different characters, three different character symbols are shown in the fourth, fifth and sixth positions on the numerical key “0” as shown in FIG. 7.

[0037] The code “04” is for the selection of hiragana. After entering the two numerical keys “0” and “4”, the alphabet “ㇰ” of hiragana can be displayed by pressing “31”. Furthermore, if the code “05” is entered, the hiragana “ㇰ” is converted to the katakana “サ”. FIG. 7 illustrates how the alphabets of hiragana in Japanese are grouped and assigned to the numerical keys. If an information appliance is mainly used in Japan, “01”, “02” and “03” can be used to select hiragana, katakana and kanji of Japanese.

English can be selected with "04".

[0038] In Japanese, a hiragana may have a modified version. For example, by adding the symbol "゛" to a hiragana changes its consonant but leaves the vowel unchanged. The symbol "゛" can be entered by a code "26" because it is grouped and positioned in
5 the sixth position in the numerical key "2". Therefore, to display the hiragana "く゛", the code "2623" is entered. Similarly, the symbol "゜" can be entered by using the code "36" since it is in the sixth position of the group assigned to the numerical key "3". The character "ゝ" can be shown by entering "3662". Furthermore, the symbol "+" which has a code "46" can be entered between two phonetic symbols. For example, "きよ" is
10 represented by the code "224693" and "じゆ" is represented by the code "26324692". The two commonly used punctuation symbols "、" and "。" are in the sixth positions of the numerical keys "5" and "6" respectively.

[0039] According to the present invention, alphabets or phonetic symbols of Korean, Russian and Arabian and numerical digits may be grouped and assigned to the numerical
15 keys as shown in FIGs. 8, 9, and 10 so that these languages can be entered and displayed on an information appliance.

[0040] With reference to FIG. 3, the alphabets or phonic symbols of English, German, French, Italian, Spanish, Japanese and Chinese have been grouped and assigned to appropriate numerical keys. In other words, these different languages can be selected
20 and entered using the ten numerical keys "0" to "9". Because most of these languages primarily use lower cases and the phonetic symbols for representing Japanese, Korean or

Chinese are also similar to the lower case alphabets of English, lower case alphabets are labeled on the numerical keys as shown in FIG. 3. If upper case alphabets are needed, the upper case mode can be selected by pressing the numerical keys "0" and "1" simultaneously.

5 [0041] In order to preserve key functions for doing mathematical operations, an "=" symbol is grouped into the eighth position on the numerical key "0". By pressing the numerical keys "0" and "8" simultaneously, the mathematical operation mode is selected. Under this condition, the additional operational keys "+", "-", "x" and "÷" can be used to enter mathematical operations.

10 [0042] Accordingly, the present invention provides an efficient method for using numerical keys to enter alphabets, phonetic symbols or numerical digits of various languages. Based on the principle of a two dimensional matrix, if the total number of alphabets, phonetic symbols or digits is X, the number of keys required is $Y = \sqrt{X}$. If the square root of X is not an integer, the required number of keys is the integer part of \sqrt{X} plus 1. For example, 26 English alphabets requires only 6 keys to enter because $\sqrt{X} = 5.099$.

[0043] The physical arrangement of the keys on a keypad can be very flexible. The keys can be laid out in the shape of a rectangle, a square, a triangle or a circle. For example, if 6 keys are used, they can be arranged as one row with 6 keys, two rows each with 3 keys, or 3 rows each with two keys. Similarly, there are many possible arrangement if 9 keys are used.

[0044] Although the present invention has been described with reference to the

preferred embodiments, it will be understood that the invention is not limited to the details described thereof. Various substitutions and modifications have been suggested in the foregoing description, and others will occur to those of ordinary skill in the art. Therefore, all such substitutions and modifications are intended to be embraced within

5 the scope of the invention as defined in the appended claims.

What is Claimed is:

- 1 1. A method of entering alphabets or phonetic symbols of at least one language,
2 comprising the steps of:
3 dividing said alphabets or phonetic symbols into a plurality of groups and assigning
4 each group to a numerical key;
5 labeling the alphabets or phonetic symbols of each group with a predetermined
6 positional sequence on a numerical key corresponding to each group; and
7 entering a desired alphabet or phonetic symbol by first pressing a first numerical key
8 corresponding to the group of the desired alphabet or phonetic symbol, and then
9 pressing a second numerical key whose numerical digit corresponds to the positional
10 sequence of the desired alphabet or phonetic symbol labeled on the first numerical
11 key.
- 1 2. The method as claimed in claim 1, wherein said method are used to enter the
2 alphabets and phonetic symbols of one or multiple languages.
- 1 3. The method as claimed in claim 1, wherein phonetic symbols of multiple languages
2 including Chinese, Japanese and Korean are grouped and assigned to numerical keys
3 for entering according to their representations with English alphabets.
- 1 4. The method as claimed in claim 1, further including a method of selecting a language
2 from multiple languages comprising the steps of:
3 assigning a numerical key for language selection;
4 providing a symbol for each language and labeling each language symbol in a
5 predetermined positional sequence on said language selection numerical key; and

6 selecting a desired language by first pressing said language selection numerical key,
 7 and then pressing a second numerical key whose numerical digit corresponds to the
 8 positional sequence of the symbol of the desired language labeled on said language
 9 selection numerical key;

10 wherein the symbol of a primary language used in a local area is labeled as a first one
 11 in the predetermined positional sequence on said language selection numerical key,
 12 and the symbols of other languages are labeled in sequence on said language selection
 13 numerical key according to their frequencies of use in said local area.

1 5. The method as claimed in claim 1, said step of dividing alphabets or phonetic
 2 symbols into a plurality of groups and assigning each group to a corresponding
 3 numerical key including a step of computing the square root of the total number of
 4 alphabets or phonetic symbols in a language to determine a minimum number of keys
 5 required, wherein the minimum number of keys required is the square root if the
 6 square root is an integer, or one plus the integer part of the square root if the square
 7 root is not an integer.

1 6. The method as claimed in claim 1, wherein numerical keys are arranged in the shape
 2 of a rectangle, a square, a triangle or a circle on a key pad.

ABSTRACT

1 A method for entering multiple languages divides the alphabets or phonetic
2 symbols of a language into a plurality of groups and assigns each group to a numerical
3 key. The alphabets or phonetic symbols of each group are labeled on the assigned
4 numerical key in sequence. An alphabet or phonetic symbol in a group is entered by first
5 pressing the corresponding numerical key and then pressing another numerical key whose
6 digit corresponds to the positional sequence of the desired alphabet or phonetic symbol in
7 its group. A numerical key is designated as the language selection key. Symbols
8 representing different languages are labeled in sequence on the language selection key.
9 Using a similar approach, a language can be selected by first pressing the language
10 selection key and then pressing a numerical key whose digit corresponds to the positional
11 sequence of the desired language.

country Alphabets comparison	English	German	French	Italian	Spanish
	a b c d e f g h i j k l m n o p q r s t u v w x y z	a b c d e f g h i j k l m n o p q r s t u v w x y z	a b c d e f g h i j k l m n o p q r s t u v w x y z	a b c d e f g h i — — l m n o p q r s t u v — — — z	a b c d e f g h i j k l m n o p q r s t u v w x y z
Difference from English		ä ö ü ß	à é c î ô ù â ê ÿ œ û ä ë ü ë æ	à è î ò ù ã ẽ i ɔ ũ	ch á ll é ñ í rr ó ú

FIG. 1

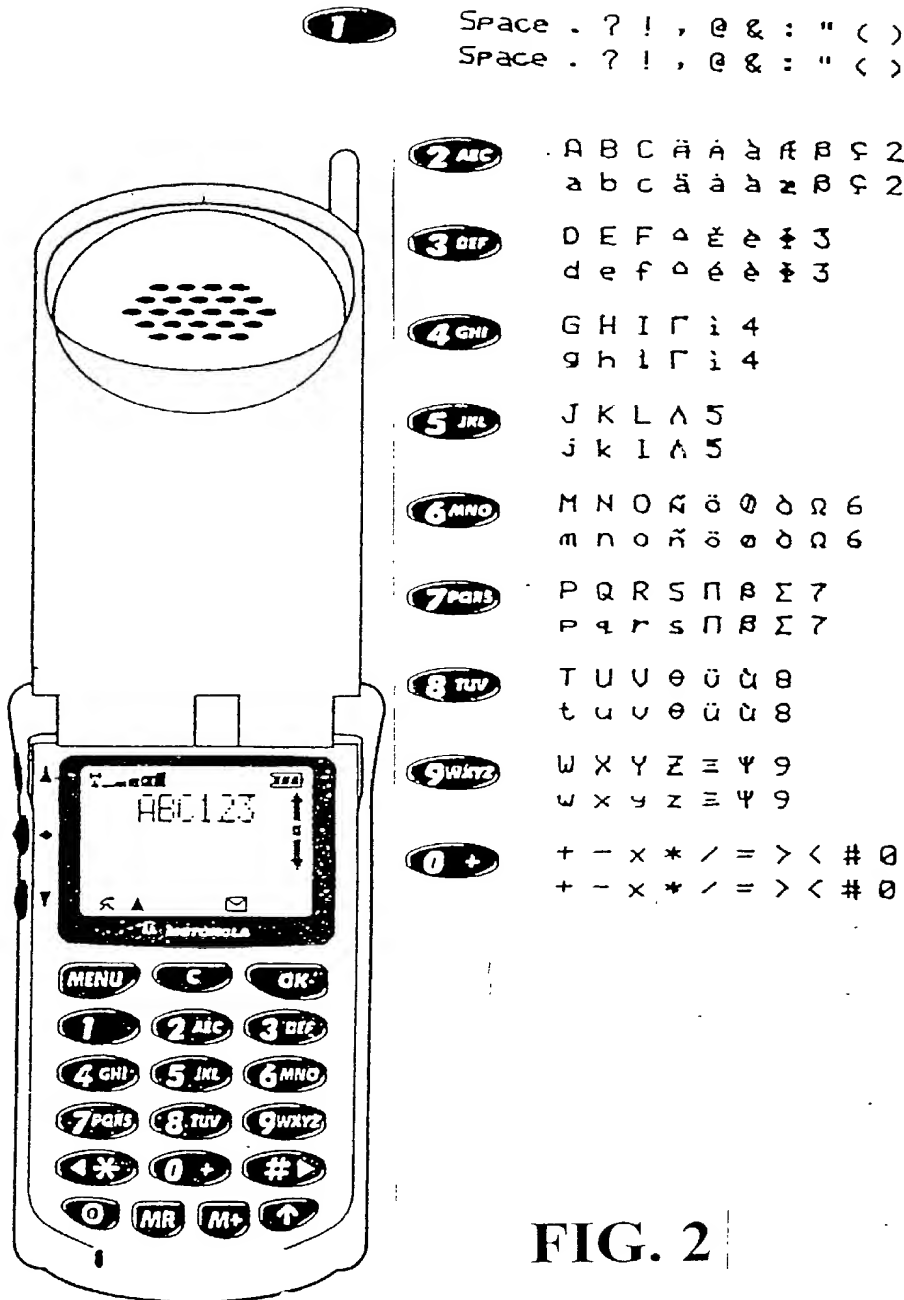


FIG. 2

1
(zh)
a b c d , .

2
(en)(eng)(ang)
e f g h ; -

3
(ch)(an)(ao)(ai)
i j k l m n

4
(ou) (ong)
o p q r s t

5
(sh)(ü)(ei)(ing)
u v w x y z

6
.. / \ ^ ~ œ

7
ç β ñ

8
? ! : () /

9
x / ✓ \ - →

0
A a 中 あ マ 漢 ト =

FIG. 3

Hiragana	あ	か	さ	た	な	は	ま	や	ら	わ	ん	が	ざ	だ	ば	ぱ
	a	ka	sa	ta	na	ha	ma	ya	ra	wa	n	ga	za	da	ba	pa
	い	き	し	ち	に	ひ	み		り			ぎ	じ	ぢ	び	ぴ
	i	ki	shi	chi	ni	hi	mi		ri			gi	ji	ji	bi	pi
	う	く	す	つ	ぬ	ふ	む	ゆ	る			ぐ	ず	づ	ぶ	ぷ
	u	ku	su	tsu	nu	fu	mu	yu	ru			gu	zu	zu	bu	pu
	え	け	せ	て	ね	へ	め		れ			げ	ぜ	で	べ	ぺ
	e	ke	se	te	ne	he	me		re			ge	ze	de	be	pe
	お	こ	そ	と	の	ほ	も	よ	ろ	を		ご	ぞ	ど	ぼ	ぽ
	o	ko	so	to	no	ho	mo	yo	ro	o		go	zo	do	bo	po
		きゃ	しゃ	ちゃ	にゃ	ひゃ	みゃ		りゃ			ぎゃ	じゃ		びゃ	ぴゃ
		kya	sha	cha	nya	hya	mya		rya			gya	ja		bya	pya
		きゅ	しゅ	ちゅ	にゅ	ひゅ	みゅ		りゅ			ぎゅ	じゅ		びゅ	ぴゅ
		kyu	shu	chu	nyu	hyu	myu		ryu			gyu	ju		byu	pyu
Katakana	ア	カ	サ	タ	ナ	ハ	マ	ヤ	ラ	ワ	ン	ガ	ザ	ダ	バ	パ
	a	ka	sa	ta	na	ha	ma	ya	ra	wa	n	ga	za	da	ba	pa
	イ	キ	シ	チ	ニ	ヒ	ミ		リ			ギ	ジ	ヂ	ビ	ピ
	i	ki	shi	chi	ni	hi	mi		ri			gi	ji	ji	bi	pi
	ウ	ク	ス	ツ	ヌ	フ	ム	ユ	ル			グ	ズ	ヅ	ブ	プ
	u	ku	su	tsu	nu	fu	mu	yu	ru			gu	zu	zu	bu	pu
	エ	ケ	セ	テ	ネ	ヘ	メ		レ			ゲ	ゼ	デ	ヘ	ペ
	e	ke	se	te	ne	he	me		re			ge	ze	de	be	pe
	オ	コ	ソ	ト	ノ	ホ	モ	ヨ	ロ	ヲ		ゴ	ゾ	ド	ボ	ポ
	o	ko	so	to	no	ho	mo	yo	ro	o		go	zo	do	bo	po
		キャ	シャ	チャ	ニャ	ヒャ	ミャ		リャ			ギャ	ジャ		ビャ	ピャ
		kya	sha	cha	nya	hya	mya		rya			gya	ja		bya	pya
		キュ	シュ	チュ	ニユ	ヒユ	ミユ		リュ			ギユ	ジュ		ビユ	ピユ
		kyu	shu	chu	nyu	hyu	myu		ryu			gyu	ju		byu	pyu
		キョ	ショ	チョ	ニョ	ヒョ	ミョ		リョ			ギョ	ジョ		ビョ	ピョ
		kyo	sho	cho	nyo	hyo	myo		ryo			gyo	jo		byo	pyo

FIG. 4

Single Vowel	ㅏ	ㅑ	ㅓ	ㅕ	ㅗ	ㅛ
	ah	ya	u	yu	o	yo
	ㅓ	ㅕ	ㅡ	ㅣ		
	oo	yoo	eu	i		
Combined Vowel	ㅘ	ㅙ	ㅚ	ㅜ	ㅝ	ㅞ
	ae	yae	e	ye	oe	wi
	ㅟ	ㅠ	ㅢ	ㅤ	ㅥ	
	ui	wa	wo	wae	we	
Single consonant	ㄱ	ㄴ	ㄷ	ㄹ	ㅁ	ㅂ
	g	n	d	r	m	b
	ㅇ	ㅇ	ㅈ	ㅊ	ㅋ	ㅌ
	s	ng	j	ch	k	t
	ㅍ	ㅎ				
	p	h				
Double consonant	ㄱㄱ	ㄴㄴ	ㄷㄷ	ㄹㄹ	ㅁㅁ	
	gg	dd	bb	ss	jj	

FIG. 5

Consonant	b	p	m	f	d	t	n	l
	ㄅ 玻	ㄆ 坡	ㄇ 模	ㄈ 佛	ㄉ 得	ㄊ 特	ㄋ 訥	ㄌ 勒
	g	k	h		j	q	x	
	ㄍ 哥	ㄎ 科	ㄏ 喝		ㄐ 基	ㄑ 欺	ㄒ 希	
Vowel	zh (a) ㄓ 知	ch (i) ㄔ 蚩	sh (u) ㄕ 詩	r ㄖ 日	z ㄗ 資	c ㄘ 雌	s ㄙ 思	
			i 一 衣		u ㄨ 烏		ü (v) ㄩ 迂	
	a ㄚ 啊		ia 一ㄚ 呀		ua ㄨㄚ 蛙			
	o ㄛ 喔				uo ㄨㄛ 窩			
Vowel	e ㄜ 鵝		ie 一ㄝ 耶				ue ㄩㄝ 約	
	ai (i) ㄞ 哀				uai ㄨㄞ 歪			
	ei (w) ㄟ 矣				uei ㄨㄟ 威			
	ao (k) ㄠ 熬		iao 一ㄠ 腰					
	ou (p) ㄡ 歐		iou 一ㄡ 優					
	an (j) ㄢ 安		ian 一ㄢ 煙		uan ㄨㄢ 彎		uan ㄩㄢ 冤	
	en (f) ㄣ 恩		in 一ㄣ 因		uen ㄨㄣ 溫		un ㄩㄣ 冤	
	ang (h) ㄤ 昂		iang 一ㄤ 央		uang ㄨㄤ 汪			
	eng (g) ㄥ 呼的韻母		ing 一ㄥ 英		ueng ㄨㄥ 翁			
	ong (s) (ㄨㄥ) 轟的韻母		iong ㄩㄥ 雍					

FIG. 6

1
あ い う え お ん
a b c d , .

2
か き く け こ ゃ
e f g h i j

3
さ し す せ そ っ
i j k l m n

4
た ち つ て と っ
o p q r s t

5
な に ぬ ね の ん
u v w x y z

6
は ひ ふ へ ほ っ
... / \ ^ v oe

7
ま み む め も ー
ç β ñ

8
ら り る れ ろ
? ! : () /

9
や ゆ よ わ を
x / \ - →

0
あ マ 漢 A a
A a 中 あ マ 漢 ト =

FIG. 7

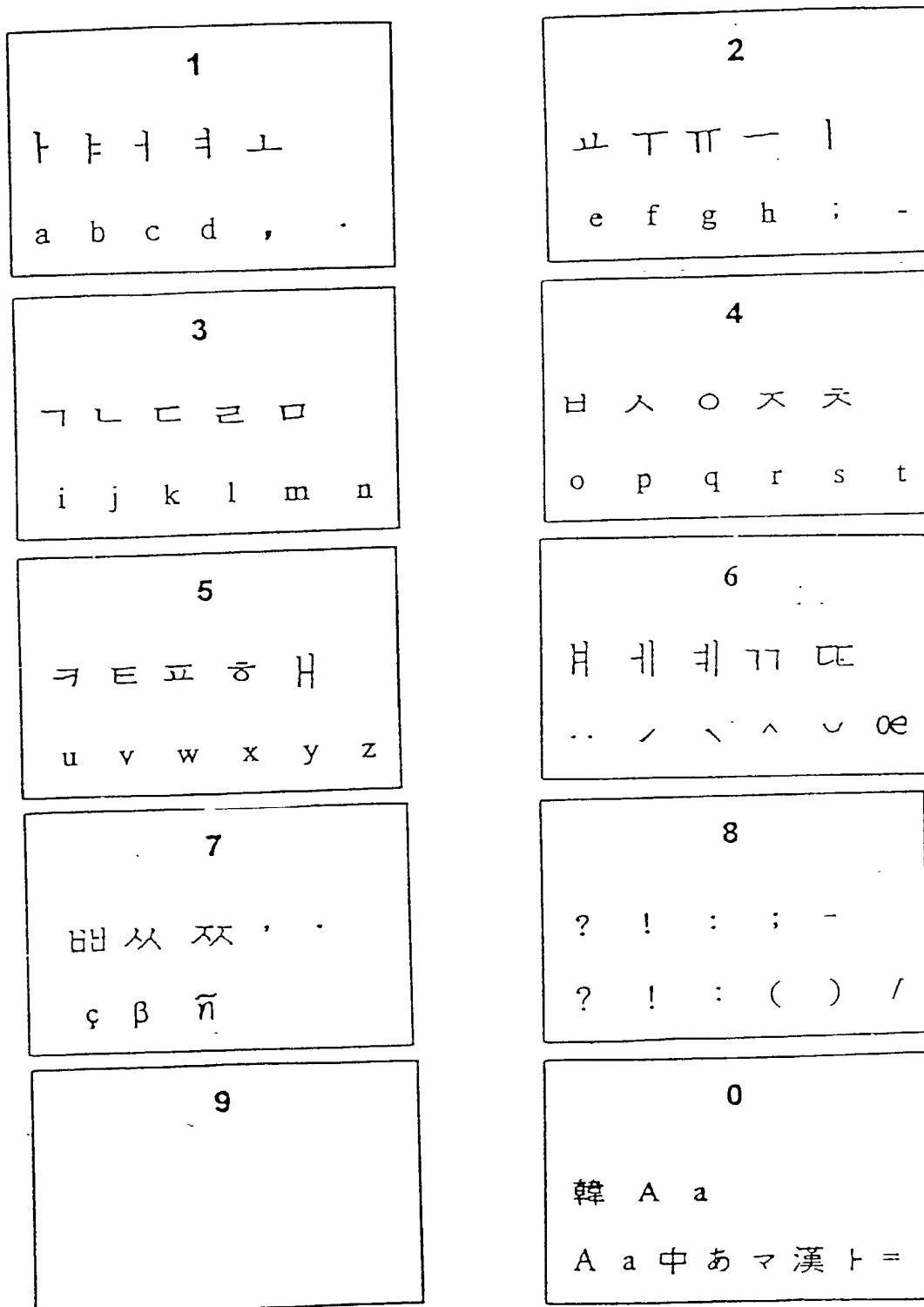


FIG. 8

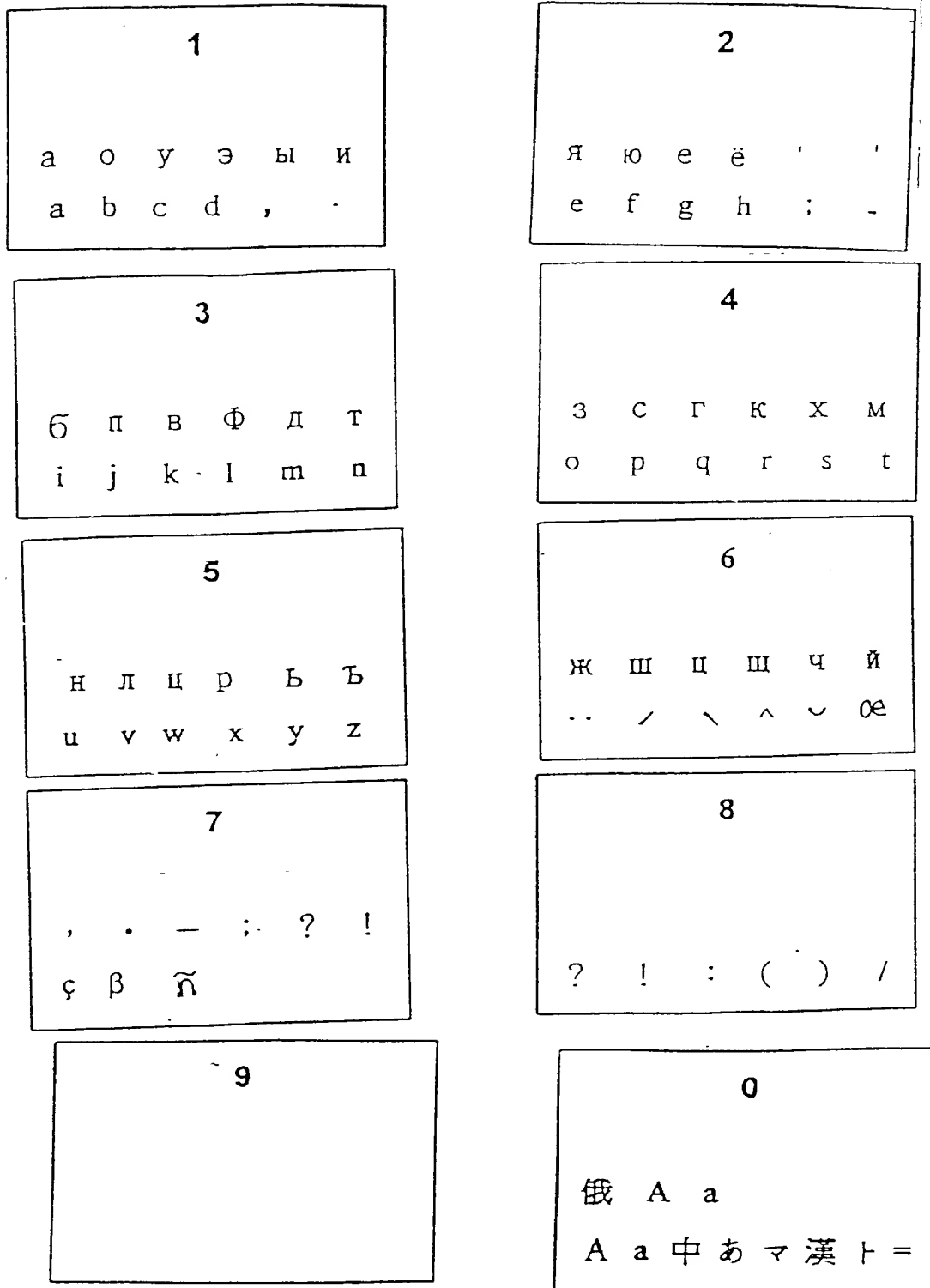


FIG. 9

١ ح ح ث ت ب ا a b c d , .	٢ س ز ر ذ د خ e f g h ; -
٣ ع ظ ط ض ص ش i j k l m n	٤ م ل ك ق ف غ o p q r s t
٥ ـ ـ ي و ه ن u v w x y z	٦ ُ ُ ُ ُ ُ ُ .. / \ ^ ˘ œ
٧ ، . - ؟ ç β ñ	٨ ? ! : () /
٩	ش A a A a 中 あ マ 漢 ト =

FIG. 10

UNITED STATES OF AMERICA COMBINED DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION		FILE NO. UPA-01149																																																
<p>As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name and that I verily believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled</p> <p>INPUT METHOD OF MATRIX TYPE FOR ENTERING ALPHABETS OR PHONETIC SYMBOLS OF the specification of which is attached hereto, unless the following box is checked MULTIPLE LANGUAGES</p> <p><input checked="" type="checkbox"/> was filed on Nov. 20, 1998 United States patent application Serial Number _____, or PCT International patent application No. PCT/CN98/00276 and was amended on _____ (if any)</p> <p>I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.</p> <p>I acknowledge the duty to disclose all information known to be material to patentability in accordance with Title 37, Code of Federal Regulations, Section 1.56.</p> <p>I hereby claim foreign priority benefits under Title 35, United States Code, Section 119 of any foreign application(s) for patent or inventor's certificate or United States provisional application(s) listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.</p> <p>Prior Foreign Application(s) or Provisional Application(s)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">COUNTRY</th> <th style="width: 35%;">APPLICATION NUMBER</th> <th style="width: 20%;">DATE OF FILING (day, month, year)</th> <th style="width: 20%;">PRIORITY CLAIMED UNDER 35 U.S.C.119</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td>YES NO</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td>YES NO</td> </tr> </tbody> </table> <p>I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112 I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">UNITED STATES APPLICATION NUMBER</th> <th style="width: 35%;">DATE OF FILING (day, month, year)</th> <th style="width: 35%;">STATUS (patented, pending, abandoned)</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> <p>I hereby appoint the agent(s), whose name(s), Registration No(s), and address is list below/per attached, as my principal agent(s) with full power of substitution and revocation to prosecute this application, to transact all business in the Patent and Trademark Office connected therewith and to receive all correspondence</p> <p>SEND CORRESPONDENCE TO : <u>Jason Z. Lin</u> Tel: (408) 867-9757 <u>19597 Via Monte Drive</u> Fax: (408) 867-7437 <u>Saratoga, CA 95070</u></p> <p>I hereby declare that all statements made herein of my own knowledge are true and that all statement made on information and belief are believed to be true, and further that these statement were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 40%;">FULL NAME OF SOLE OR FIRST INVENTOR Chienhsin KUO</td> <td style="width: 30%;">INVENTORS SIGNATURE <i>Kuo Chien Hsin</i></td> <td style="width: 30%;">DATE May 7, 2001</td> </tr> <tr> <td colspan="2">RESIDENCE 5Fl., No. 42, Lane 105, 20 Chang Rd., Hsin-Tien City, Taipei Hsien, Taiwan, P. R. China</td> <td>COUNTRY OF CITIZENSHIP Taiwan</td> </tr> <tr> <td colspan="3">POST OFFICE ADDRESS same as above</td> </tr> <tr> <td>FULL NAME OF SECOND JOINT INVENTOR (if any) Minghui LI</td> <td>INVENTORS SIGNATURE <i>Minghui LI</i></td> <td>DATE May 7, 2001</td> </tr> <tr> <td colspan="2">RESIDENCE No. 25, Lane 362, Sung-Chian Rd., Chung-Shan District, Taipei, Taiwan, P. R. China</td> <td>COUNTRY OF CITIZENSHIP Taiwan</td> </tr> <tr> <td colspan="3">POST OFFICE ADDRESS Same as above</td> </tr> <tr> <td>FULL NAME OF THIRD JOINT INVENTOR (if any)</td> <td>INVENTORS SIGNATURE</td> <td>DATE</td> </tr> <tr> <td>RESIDENCE</td> <td colspan="2">COUNTRY OF CITIZENSHIP</td> </tr> <tr> <td colspan="3">POST OFFICE ADDRESS</td> </tr> </table>			COUNTRY	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 U.S.C.119				YES NO				YES NO	UNITED STATES APPLICATION NUMBER	DATE OF FILING (day, month, year)	STATUS (patented, pending, abandoned)							FULL NAME OF SOLE OR FIRST INVENTOR Chienhsin KUO	INVENTORS SIGNATURE <i>Kuo Chien Hsin</i>	DATE May 7, 2001	RESIDENCE 5Fl., No. 42, Lane 105, 20 Chang Rd., Hsin-Tien City, Taipei Hsien, Taiwan, P. R. China		COUNTRY OF CITIZENSHIP Taiwan	POST OFFICE ADDRESS same as above			FULL NAME OF SECOND JOINT INVENTOR (if any) Minghui LI	INVENTORS SIGNATURE <i>Minghui LI</i>	DATE May 7, 2001	RESIDENCE No. 25, Lane 362, Sung-Chian Rd., Chung-Shan District, Taipei, Taiwan, P. R. China		COUNTRY OF CITIZENSHIP Taiwan	POST OFFICE ADDRESS Same as above			FULL NAME OF THIRD JOINT INVENTOR (if any)	INVENTORS SIGNATURE	DATE	RESIDENCE	COUNTRY OF CITIZENSHIP		POST OFFICE ADDRESS		
COUNTRY	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 U.S.C.119																																															
			YES NO																																															
			YES NO																																															
UNITED STATES APPLICATION NUMBER	DATE OF FILING (day, month, year)	STATUS (patented, pending, abandoned)																																																
FULL NAME OF SOLE OR FIRST INVENTOR Chienhsin KUO	INVENTORS SIGNATURE <i>Kuo Chien Hsin</i>	DATE May 7, 2001																																																
RESIDENCE 5Fl., No. 42, Lane 105, 20 Chang Rd., Hsin-Tien City, Taipei Hsien, Taiwan, P. R. China		COUNTRY OF CITIZENSHIP Taiwan																																																
POST OFFICE ADDRESS same as above																																																		
FULL NAME OF SECOND JOINT INVENTOR (if any) Minghui LI	INVENTORS SIGNATURE <i>Minghui LI</i>	DATE May 7, 2001																																																
RESIDENCE No. 25, Lane 362, Sung-Chian Rd., Chung-Shan District, Taipei, Taiwan, P. R. China		COUNTRY OF CITIZENSHIP Taiwan																																																
POST OFFICE ADDRESS Same as above																																																		
FULL NAME OF THIRD JOINT INVENTOR (if any)	INVENTORS SIGNATURE	DATE																																																
RESIDENCE	COUNTRY OF CITIZENSHIP																																																	
POST OFFICE ADDRESS																																																		